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NORTH AMERICAN AIR DEFENSE COMMAND

WIR

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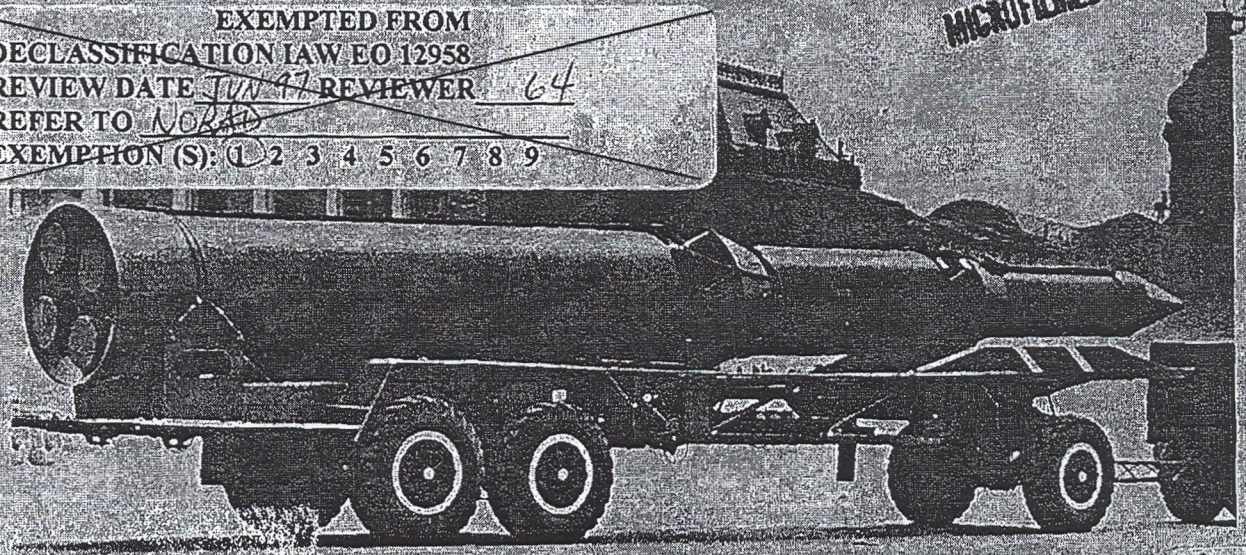

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Issue No. 21/65, 21 May 1965

The WIR in Brief

Communist Military Capabilities

LARGE PARADE MISSILE LIQUID PROPELLED, DOES NOT COMPLETELY MATCH ANY KNOWN VEHICLE 2
Definitely not the SS-6 used to launch most space vehicles.

Portion identified as non-responsive to the appeal

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Space

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Soviet public still not informed.
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Estimate based on magnetometer shown Westerner.
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Portion identified as non-responsive to the appeal

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COVER: Soviet solid-propellant ICBM in 9 May parade. (From "Aviation Week") (OFFICIAL USE ONLY)
NOTE: Pages 20, 22, 23, 26, 27, 30, 31, 34, 35 and 36 of this issue are blank.

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COMMUNIST MILITARY CAPABILITIES

current developments and trends in the armed forces of the Communist World

Large Parade Missile Liquid Propelled; Does Not Completely Match any Known Vehicle

The Soviets announced that the large 3-stage missile paraded in Moscow on 9 May "is powered by solid fuels" and "is similar to the rockets used to launch Voskhod and Vostok spaceships." An FTD analysis indicates, however, that the propulsion systems of the first two stages are liquid bipropellant systems. Further, the 3-stage vehicle definitely is not the parallel-stage SS-6 ICBM which the Soviets have used as a booster for the Voskhods and Vostoks. (Photo on page 21.)

The missile does not, in fact, match the telemetry of any known Soviet ICBM test or orbital flight, although it is believed capable of performing as either an ICBM or a space launcher.

The evidence is overwhelming that the missile uses liquid -- not solid -- propellants:

- The first stage has access ports which indicate an intertankage section typical of a liquid stage.
- Weld seams in the second stage indicate the presence of two liquid-propellant tanks, with an intertank equipment section.
- The nozzles on the first stage appear to be double-walled and liquid-cooled, that is, the propellant is circulated around the nozzles to cool them and to preheat the propellant. (See photo on page 24.)
- A 3-stage solid-propellant ICBM the size of this parade missile would far exceed in weight the load capacity of the transporter used. Such a missile would weigh more than 500,000 pounds; the load capacity of the transporter would appear to be about 60,000 pounds.

Third-stage propulsion cannot be evaluated on the basis of presently available data. It is, in fact, not possible to state with certainty that this stage includes propulsion; it may be a nonrecoverable space vehicle -- with or without propulsion -- not intended to re-enter.

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Preliminary estimates of characteristics and performance:

Over-all length	About 115 feet
Diameter, 1st & 2d stages	About 8.9 feet
Diameter, 3d stage	About 7.8 feet
Gross takeoff weight	About 350,000 pounds
Dry weight, including payload	About 45,000 pounds
Payload weight	About 3,500 pounds; if the small sphere-cone segment of the third stage is the re-entry vehicle
Total vacuum thrust, 1st stage	550,000 to 650,000 pounds

(FTD)

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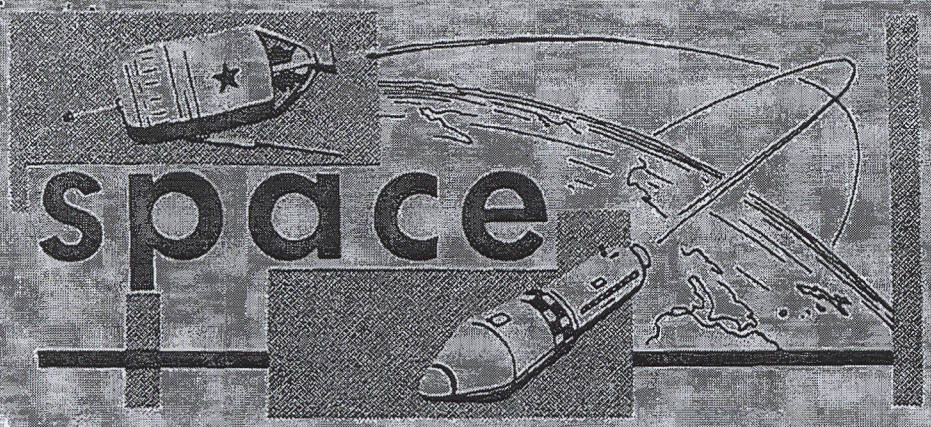

significant intelligence on space developments and trends

Soviets' Latest Mars Probe Fails with Loss of Communications

The Soviets' most recent Mars probe, Zond 2, which was launched from Tyuratam on 30 November 1964, apparently will not accomplish any useful mission when it makes its closest approach to the red planet this summer.

Gennadiy Skuridin, a top Soviet physicist who led a 6-man delegation from the USSR to a Space Exploration Conference in Chicago this month, told reporters that Zond 2's transmissions had been irregular recently and now seem to have ceased entirely.

50X1 and 3, E.O.13526

TASS's initial announcement of 1 December, which said that the probe's power supply was only half as strong as expected, may help explain the evident failure of communications.

Skuridin's statement indicates that the Soviet program for exploring space with unmanned vehicles continues to be plagued by relatively early communications failures. Few of the more than 100 Soviet payloads launched to date have transmitted signals for more than 6 months.

Skuridin's statement contrasts with the optimistic information reportedly attributed to Mstislav Keldysh, President of the Soviet Academy of Sciences, when signals were still being received from Zond 2. Keldysh allegedly said that the Soviet probe was highly instrumented, weighed about a ton, and would pass within 800 nautical miles of Mars on 6 August. (The Soviets' Mars 1, which was launched on 1 November 1962, also weighed about a ton, according to TASS, and carried a wide assortment of gear for photographing Mars, gathering "geophysical" data about that planet, and collecting information on the interplanetary space environment. See page 7, WIR 43/64.)

Most of the information disclosed by Skuridin and Keldysh has not to date been revealed to the Soviet public. There have been three known TASS announcements about Zond 2:

- The 1 December announcement reported the launch and said that the vehicle was headed toward Mars and would gather data on the interplanetary space environment. (TASS did not identify Zond 2 specifically as a Mars probe.) The rest of the announcement was routine, except for an admission that only half the power supply expected for radio communications apparently was available.

- Red Star, Soviet military newspaper, on 10 December 1964 carried a TASS announcement that 11 communications sessions had been held with the probe between 4 and 8 December and that communications were stable (page 11, WIR 51/64).

- Red Star of 20 December, also quoting TASS, said that 12 radio communications sessions had been held with the probe during the period 8-18 December, that communications were stable, and that "plasma electro-reaction engines" were used as a means of controlling the probe's orientation (page 11, WIR 1/65).

These reports also gave the probe's celestial coordinates and its distance from the Earth. No mention was made of any midcourse guidance correction, unlike earlier claims of 2 successful corrections for Zond 1 (a Venus probe, launched on 2 April 1964, which also failed through loss of communications). SPADATS, using data from 2 early optical observations of the probe by Mount Palomar, estimated that Zond 2 would miss its target by 100,000 miles if no course corrections were made.

The Soviets would thus appear to have two different public relations policies with respect to interplanetary probes, one for the Soviet public and one for the West. With regard to the Soviet public, the Soviet leadership tries to dramatize its space successes and conceal its failures. In dealing with the West the Soviets have to be more realistic thanks to the West's space-tracking facilities.

The cessation of TASS reporting on Zond 2 about 20 December suggests that the Soviets realized shortly thereafter that the probe's communications eventually would fail.

Zond 2 is the Soviets' 13th known interplanetary attempt. The record is shown on page 33.

(Press; TASS; SPADATS; Western sensors; NORAD)
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KY Cosmos Instrumentation
Weight Probably 50 Lbs or Less

Weight of the scientific instruments on Cosmos-series research vehicles launched from Kapustin Yar (KY) probably does not exceed 50 pounds for any one vehicle. Total payload weight for these vehicles, which are believed to be launched by the SS-4 MRBM or SS-5 IRBM, is estimated at 300-500 pounds. Most of the

rest of the weight is taken up by beacons, telemetry gear, electrical-power supply, the orientation mechanism, and the necessary structural members.

The estimate of instrumentation weight is based on data supplied a US scientist who visited the USSR several months ago. He was shown a magnetometer of the type said to have been used on Cosmos 26, which was launched from KY on 18 March 1964. The transistorized electronic package of the magnetometers measured about 4x8x12" and weighed 10 pounds. Each of the two sensing elements (about the size of a "stubby beer bottle") weighed 2.2 pounds. Thus, total instrumentation weighed about 14.5 pounds. Total weight of the magnetometer package, including the extendable booms needed to separate the sensing elements from the spacecraft, was probably 20 pounds or less. The batteries to power the magnetometers, which require larger power supplies than most scientific space instrumentation, probably would weigh no more than 30 pounds. Total weight of instrumentation and power supply would be about 50 pounds. This may represent the maximum weight of scientific instrumentation of KY Cosmoses, for a payload package requiring very little power. A 50-pound instrumentation package would take up only 1/10th to 1/6th of total payload weight -- a much smaller ratio than would be found in comparable US satellites.

The Soviets have labeled all their Cosmoses as scientific research vehicles. The KY Cosmoses are believed to fall into this category, but Tyuratam-launched Cosmoses are birds of much different feathers. Many of them are reconnaissance -- photographic and/or electronic -- satellites (which may collect scientific data on the side), many are test or experimental vehicles, and others are lunar or interplanetary probes which have been injected into parking orbit but which have not been injected into transfer trajectory toward their targets.

No attempt has been made to date to recover any of the KY Cosmoses.

(CIA; NORAD)

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Cosmos 66 De-Orbited Routinely;
Tempo of Photorecce Missions Stepped Up

Cosmos 66, which the Soviets launched from Tyuratam (TT) at about 0931Z, 7 May, was de-orbited on Revolution 127, and impacted at about 0635 - 0640Z, 15 May, after nearly 8 days in orbit. This vehicle is the 16th TT-launched Cosmos to be de-orbited on Revolutions 126-128.

The mission of Cosmos 66 was photoreconnaissance, although it could easily have carried equipment for performing additional missions.

The Soviets have launched 5 photoreconnaissance vehicles so far this year -- Cosmoses 52, 59, 64, 65, and 66. Last year, the Soviets had launched only 2 such vehicles by the middle of May.

Stepped-up activity this year is possibly attributable to Soviet interest in Western activity in Southeast Asia and the Caribbean and to Chinese Communist activity at the nuclear test site at Lop Nor in northwest China.

This year's Soviet photoreconnaissance missions have been marked to date by:

- A total absence of launches of vehicles into orbits having inclinations of 51 degrees. There were four such launches last year.
- A regular alternation in the use of Lunik and Venik upper stages. The first, third, and fifth photorecce Cosmoses this year used the light Lunik stage, the second and fourth used the heavy Venik. (The heavy Venik is associated with use of a high resolution (5'-8') camera system.)

(SPADATS; NORAD)
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Lunik 5, Launched Unseasonably; Apparently Crashed on Moon When Retrorockets Failed

Lunik 5, the Soviets' third apparent attempt this year to soft-land an instrumented package on the Moon, impacted about 5 minutes ahead of schedule. This fact suggests that the retrorockets, which should have slowed the probe to a soft landing, did not work properly, if at all.

An early TASS announcement said that Lunik 5 would reach the Moon in the area of the Sea of Clouds at about 1915Z, 12 May. A later TASS announcement, issued an hour after impact, said that the probe had hit the Moon at 1910Z in the area of the Sea of Clouds. Western intercepts of Lunik 5 telemetry which began about 4.5 hours before the impact ceased abruptly at 1909:46Z, which was probably the time of actual impact.

Propulsion. Lunik 5 was launched from Tyuratam at about 0750Z, 9 May, by an SS-6 ICBM booster-sustainer, injected into parking orbit of the Earth by a heavy Venik third stage, and injected into transfer trajectory toward the Moon by the Soviets' fourth (interplanetary) stage. TASS claimed that a midcourse guidance maneuver was performed late on 10 May; such a maneuver is well within known Soviet technical capabilities.

50X1 and 3, E.O.13526

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After the payload was injected into transfer trajectory toward the Moon, one ELINT facility [redacted] 9 May, and held it for about 1 hour, 40 minutes; the signal went down abruptly -- probably on command from the ground -- at 2347Z, about the time that the Crimean tracking facility would have lost line-of-sight contact with Lunik 5.

[redacted]

50X1 and 3, E.O.13526

Significance. Circumstances surrounding the Lunik 5 event suggest that the Soviets were acting under considerable pressure. They launched the vehicle at a time when earth-Moon geometry was less than optimum for monitoring and controlling the probe from the USSR's deep-space tracking facility in the Crimea. This pressure could stem from a combination of the following factors:

- The USSR's lunar program is probably far behind schedule. The Soviets have not had a fully successful lunar probe since 4 October 1959, when Lunik 3 photographed the far, unseen side of the Moon. Between Luniks 3 and 5, there have been 8 straight Soviet failures -- 1 in 1960, 3 in 1963, 2 in 1964, and 2 in 1965. (See page 37, WIR 16/65)
- Competition from the US in the lunar race is much more brisk than it was in 1959. The US has since mounted 3 highly successful lunar photographic missions (Rangers 7, 8, and 9) and is now preparing to launch a series of Surveyors, which are intended to make soft landings on the Moon.

Earth-Moon geometry was favorable for Soviet lunar probes during the first 4 months of this year, and will not become favorable again for the Soviets until December 1965.
(SPADATS; FTD; TASS; various ELINT sensors; NORAD)
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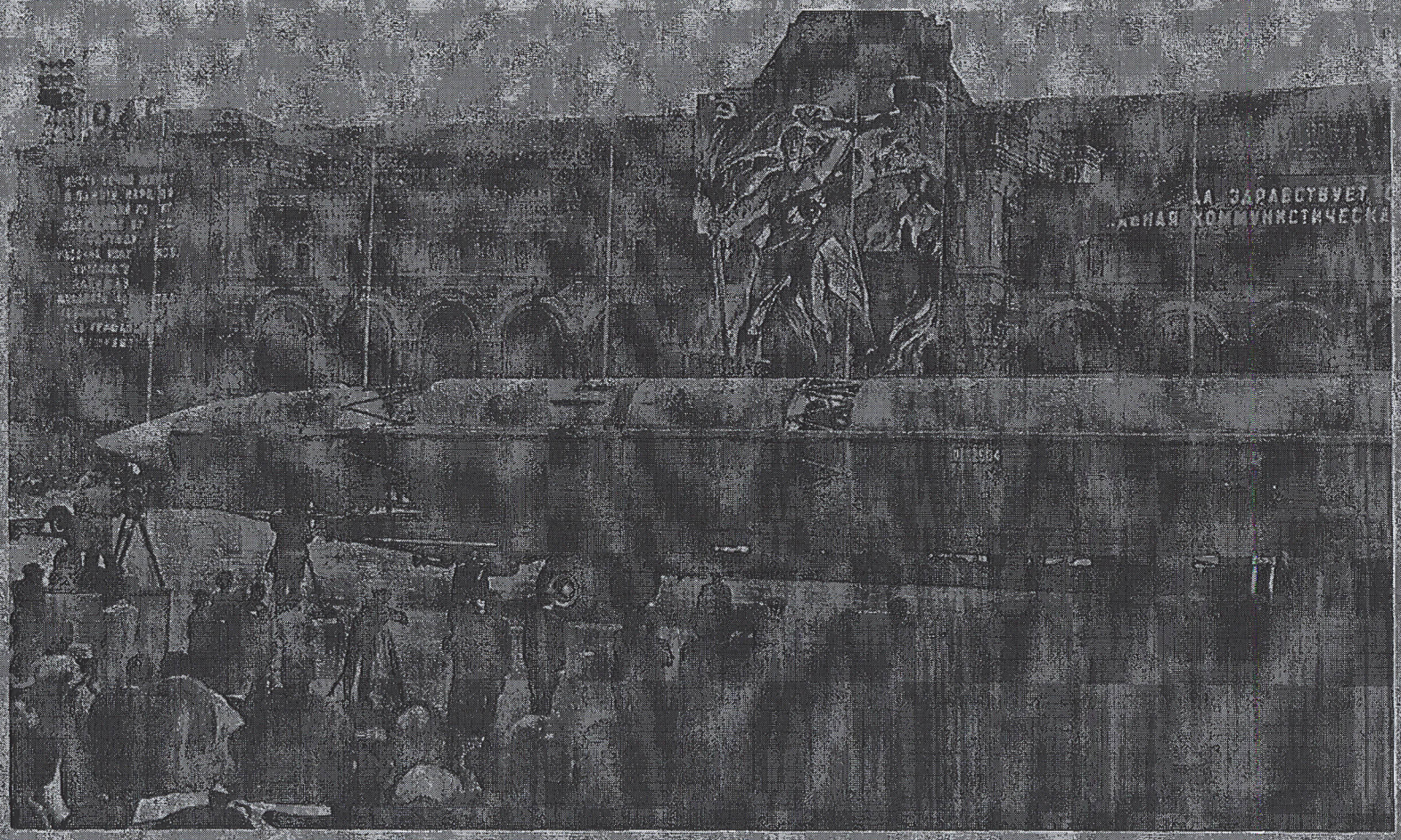
Large 3-Stage Liquid-Propellant Soviet ICBM/Space Booster
(9 May 1965, Moscow, VE-Day Parade)



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Nozzles of 1st Stage of Large Liquid-Propellant
Soviet ICBM/Space Booster
(9 May 1965, Moscow, VE-Day Parade)

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Soviet Interplanetary Probes

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DATE	TARGET	SOVIET NAME	CAUSE OF FAILURE	SUBSTANCE OF SOVIET ANNOUNCEMENTS
10 Oct 1960	Mars	None	[redacted]	None
14 Oct 1960	Mars	None		None
04 Feb 1961	Venus	Heavy Sputnik	Stabilization failed in parking orbit prior to feasible time for 4th stage ignition	An earth satellite vehicle collecting data on the near-Earth space environment (No telemetry received after injection into parking orbit.)
12 Feb 1961	Venus	Venus 1	Communications failed 11 days after launch	Successful launch of vehicle into transfer trajectory toward Venus. Payload details given.
25 Aug 1962	Venus	None	Tumbling 4th stage produced no useful thrust	None
01 Sep 1962	Venus	None	Tumbling 4th stage produced no useful thrust	None
12 Sep 1962	Venus	None	Partial failure of attitude stabilization	None
24 Oct 1962	Mars	None	Malfunction subsequent to 4th stage ignition	None
01 Nov 1962	Mars	Mars 1	Communications failed about 5 months after launch; stabilization failed	Successful launch of vehicle toward Mars announced. Payload details given. Soviets aannounced that stabilization failed.
04 Nov 1962	Mars	None	4th-stage injection failure	None
27 Mar 1964	Venus	Cosmos 27	4th-stage injection failure	Cosmos vehicle launched to collect data on near-Earth space environment.
02 Apr 1964	Venus	Zond 1	Communications failed less than 2 months after launch	Vehicle launched to assist in development of equipment for "distant interplanetary flight."
30 Nov 1964	Mars	Zond 2	Last known signal received 7 April 1965	TASS announced launch of vehicle "toward" Mars, said power supply was only half that expected. (Westerners were told that probe would come within 800 n.m. of Mars; later were told that communications had failed.)

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